A NEW SPECIES OF CONOPHYTUM AND NOTES ON THE SUBGENUS FENESTRATA AND THE SERIES MINUSCULA AND MINUTA OF EUCONOPHYTUM

R. C. Littlewood

Conophytum areolatum Littlew. sp. nov. (*Fenestrata-Pellucida*).—Planta saepius e 5 corpusculis composita, glabra; corpuscula minima in subgenere notata, lat. visa cordiformia, apice ovalia, leviter 2-loba, lobis ± aequalibus, omnino insulis punctisque ornatis, dilute brunneis, insulis viridibus, punctis impressis, rubre roseis, orificio depresso ciliato, ca. dimidium latitudinis corpusculi metiente, lateribus viridi brunneis, 6—8 mm., vel rarius ad 10 mm., longa, 6—7 mm. diametro; calyx membranaceus, 7 mm. longus, segmentis 5, subaequalibus, ca. 1·5 mm. longis; corolla alba, ad 1·9 cm. longa, tubo 1·1 cm. longo, segmentis 2—3-seriatis, apice rotundatis vel truncatis leviterque emarginatis, 5—8 mm. longis, ad 1·5 mm. latis; staminodia apice rotundata vel subtruncata, aurea, ad 3 mm. longa; stamina 4-seriata, suprema apicem tubi attingentia; stylus nullus; stigmata 5, 1·5 mm. longa.

Cape Province: Namaqualand; 18 miles N. of Khamieskroon, in shallow granite rock-pans with an eastern aspect, Oct. 1959, *R. C. Littlewood.* Karoo Garden 707/59. Fl Mart. 1960.

The name is derived from the Latin *areola* (diminutive of *area*), little space, in allusion to the honeycomb-appearance of the window.

In the classification of the genus **Conophytum** by Dr. A. Tischer as given in Jacobsen, Handb. 3 : 1042 (1960), there are 4 main divisions, each of which represents a subgenus. This may be subdivided into series, and the latter further divided into subseries. To serve as a guide a type-species is quoted in all the divisions made. But as the classification has been largely based on vegetative characters and the floral structure not been fully taken into consideration, species with widely differing floral characters from those of the type-species have been included. In order to make the classification more satisfactory these should be excluded. The first subgenus is FENESTRATA N. E. Br. ("windowed plants") with **C. fenestratum** Schwant. as the type-species. The subgenus is then divided into 2 series—*Pellucida* Schwant., with **C. pellucidum** Schwant. as the type-species, and *Subfenestrata* Tisch., with **C. subfenestratum** Schwant. as the type-species. These species were described without flowers, but from the 4-locular capsule recorded for both we may infer there were 4 calyx-segments and stigmas. **C. pellucidum**, in the first instance also described without flowers, was figured in Labarre, Mesemb. : 178, fig. 71 (1931) and the following brief description of the flower given: "Corolla 12—25 mm. in diameter, with a tube 8—10 mm. long, white with a ring of yellow staminodes at the mouth of the tube." Now it is the best known and the most widely distributed species of the genus, and may serve as a substitute for the insufficiently known species mentioned above. In Miss Carter's drawing (L. Bol., Mesemb. : 3, pl. 42, C.8) a longitudinal section of part of the flower is given, showing the "staminodes" at the apex of the corolla-tube, all the stamens enclosed in the corolla-tube, and the stigmas longer than the style, but not reaching the anthers of the lowest series of stamens. These characters, taken together with the fenestration, readily distinguish this subgenus from all the other subgenera in Dr. Tischer's classification.

Apart from **C. cylindratum** Schwant., described without flowers and with no recording of fenestration, there are 6 species, in all of which the staminodes are absent, all or some of the stamens exserted, the stigmas also exserted (remarkably so in **C. concavum**), except in the variable **C. pillansii** where they are *sometimes* enclosed. No fenestration is recorded for **C. halli, C. rubroniveum, C. primosii** (where the lobes are described as being *not* pellucid) and **C. roodiae**. The last 2 species might well be transferred to the subgenus DERENBERGIA.

The geographical distribution of the FENESTRATA, thus emended, is confined to the Vanrhynsdorp Division, Namaqualand and Bushmanland, "near Vanrhynsdorp" being the most southerly station recorded. The Namaqualand species range from 15 miles N. of Bitterfontein to 10 miles N. of Concordia, Garies, Khamieskroon, Mesklip and Springbok being intermediate stations. In Bushmanland, their eastern range, they are recorded from Kliprand, Gamoep, Namies and Pofadder, with one collection made between Kakamas and the Augrabies Falls. They are found in shallow gravel-filled rock-pans or in rock-crevices of granite-composed koppies, or in partially decomposing rock-outcrops. As with the majority of pan-dwelling **Conophyta** the roots are fibrous.

KEY TO THE SPECIES OF THE SERIES FENESTRATA

1. Capsule 4-locular; calyx-segments and stigmas 4.
    2. Corolla-segments white; style present, sometimes very short.
        3. Body narrowly clavate; orifice ciliolate .. TERRESTRE
        3. Body not narrowly clavate; orifice glabrous.
            4. Orifice equalling the width of the body.
                5. Body slightly bilobed; corolla-segments up to 2·75 mm. broad .. PARDICOLOR
                5. Body-lobes up to 2 mm. long; corolla-segments up to 1·5 mm. broad .. BOREALIS
            4. Orifice less than the width of the body .. CUPREATUM
    2. Corolla-segments pink; style absent .. .. ASTYLUM

1. Capsule 5-locular; calyx-segments and stigmas 5.
    6. Orifice equalling the width of the body, glabrous.
        7. Pellucid area clear .. .. PELLUCIDUM
        7. Pellucid area pigmented .. PELLUCIDUM var. TERRICOLOR
    6. Orifice about half the width of the body, ciliate.
        8. Orifice depressed; corolla-segments white. AREOLATUM
        8. Orifice not depressed; corolla-segments pink. LITHOPOIDES

In series 4, *Minuscula* Schwant., of the subgenus EUCONOPHYTUM Schwant. the type species, **C. minusculum** N. E. Br., has the same floral structure as that of the subgenus FENESTRATA, in that the staminodes or "contrasting inner corolla-segments" are present and the stamens and stigmas concealed in the corolla-tube. This series contains 16 species, but only **C. herrei, C. luckhoffii** and **C. reticulatum** agree in their flower-structure with the type-species (see L. Bol., Mesemb. 3 : pl. 14, C and D and pl. 44, F and M). Of the remaining 12 species listed, **C. obscurum** and **C. wiesemannianum** were described without flowers and cannot be placed; **C. ectypum, C. fulleri, C. pulchellum** and **C. vanheerdei** have the floral characters of the *Wettsteiniana*, series 3 of this subgenus. But **C. edwardsiae**, **C. eenkokerense** and **C. turrigerum** belong to the subgenus DERENBERGIA. Staminodes are also absent and the stamens exserted in **C. barbatum**, **C. comptonii** (see L. Bol., Mesemb. 3 : pl. 44, B), and in **C. auriflorum** are not recorded. These species require further study before deciding whether any of the existing series could be suggested for their reception or new ones be created.

The geographical distribution of the *Minuscula*, thus emended, is confined to the Clanwilliam, Vanrhynsdorp and Calvinia Divisions. The type-locality of **C. luckhoffii** is Citrusdal, and it also occurs near Nieuwoudtville, up to 6 miles N.E., and 17 miles N.W., of the town (*F. J. Stayner*); **C. herrei** is also found at Nieuwoudtville, near the town and N. and S. of the escarpment (*F. J. Stayner*), as well as on the Giftberg (the type-locality) and the summit of Vanrhyns Pass; **C. minusculum** has been collected at various points in the Pakhuis Pass (*Stayner* and *Littlewood*) and between Clanwilliam and Citrusdal (the type-locality?); **C. reticulatum** is known only from its type-locality on the Cedarberg in the Clanwilliam area.

KEY TO THE SPECIES OF THE SERIES MINUSCULA

1. Body 2-lobed .. .. LUCKHOFFII
1. Body not 2-lobed.
    2. Apex of the body concave; orifice linear .. .. HERREI
    2. Apex of the body not concave; orifice circular or rhomboidal.
        3. Calyx-segments and stigmas 5*; resting-sheath reticulate, apex of body truncate; orifice circular .. .. RETICULATUM
        3. Calyx-segments and stigmas 4; resting-sheath not reticulate; apex of body sloping away from the orifice .. .. .. MINUSCULUM

*C. reticulatum is the only species with 5 calyx-segments and stigmas.

The flower-structure of **C. minutum, C. pearsonii** and **C. nudum** is also like that of the subgenus FENESTRATA, the staminodes being present and the stamens and stigmas concealed in the corolla-tube. These species have been placed in the series *Wettsteiniana*, which they resemble in vegetative characters only. But they form a distinct series, *Minuta* Littlew., which with the FENESTRATA and MINUSCULA constitute a new subgenus based on floral characters. This subgenus requires a comprehensive name and CELATISTAMINA (the concealed-stamened) is considered appropriate, with **C. minutum** (Haw.) N. E. Br., the oldest species known to have this characteristic, as the type-species. In this very large and fascinating genus these 3 small series contain all the species known to have this structure.

Subgenus CELATISTAMINA Littlew. Type-species **C. minutum** (Haw.) N. E. Br.

Key to the Series of the subgenus Celatistamina

1. Leaves fenestrate; corolla-segments pink or white .. .. .. FENESTRATA
1. Leaves not fenestrate; corolla pink or purplish pink.
    2. Bodies with raised markings .. .. MINUSCULA
    2. Bodies smooth, sometimes spotted .. .. MINUTA

The *Minuta* extend from Vanrhynsdorp to approximately 10 miles N. of Bitterfontein, with one collection recorded from the Monazite mine, growing in open quartz-strewn ground, either in the open or under bushes, or occasionally in series of shale-crops.

ACKNOWLEDGEMENTS

My sincere thanks are due to Dr. L. Bolus for her invaluable guidance and assistance, without which this paper would not have been undertaken, and to Mr. F. J. Stayner for his ever generous co-operation and the careful observations he has made on his collections from the Calvinia and Clanwilliam Divisions.